APPENDIX C

THE MINERALS AND SOILS OF THE BLACK HILLS AND WIND CAVE NATIONAL PARK: Their Cultural Uses & Meanings

Of all the natural resources named and used by the tribal nations of the plains, information on minerals, rocks, clays, and soils is the weakest and least developed. There is good data on this subject for the prehistoric period, but to what degree this applies to the historic era is uncertain.

ROCKS AND MINERALS

There is a striking difference in the literatures on the Cheyennes and Lakotas when it comes to describing the uses of rocks and minerals. While there is comprehensive information on Lakota beliefs surrounding stone generically, especially its religious use and associations, there are few details about the names and identities of the specific varieties involved. Also, information on the utilitarian functions of stone is not well developed. There is much better data on the Cheyennes' practical uses for stones, although there is hardly any information on their symbolic and religious meaning.

By the time ethnographers began to consult with Lakotas and Cheyennes about their cultures at the end of the nineteenth century, materials and items of European origin replaced many traditional uses for stone. This change is reflected in what White Hawk, a Lakota, told Francis Densmore (1918:437-438) about arrow points. He recalled three different kinds of arrow points for hunting bison, the flint arrow points his grandfather flaked, the bone ones his father fashioned, and those he made from steel. What is interesting about his commentary is it shows how, within three generations, the materials and knowledge for producing certain tools had changed. Probably as a result of these changes, our understanding of native nomenclatures for specific stones and minerals, their uses and meanings is much more limited than it is for faunal and floral resources.

FLINT AND QUARTZ

At the turn of the nineteenth century, when flint was still in use, there were many locations in the greater plains region to acquire various knappable rocks, and some of the best sites were located in or near the Black Hills. Two of these sites are in close proximity to Wind Cave National Park. One is Battle Mountain, about five miles southeast of the park, where a large outcropping of variegated colored quartzite is found atop the mountain in association with numerous flaked pieces, which local whites have mistakenly interpreted as the remains of a battle site. While battles certainly took place near this location, as reported in tribal oral histories and winter counts, the debris of worked stone found atop this mountain does not reveal a battleground but a quarrying site.

Another is Flint Hill, about six miles south of Minnekahta and approximately fifteen miles southwest of the park, which also contains rich outcroppings of quartzite material. Tipi rings abound near both of these locations, and the stone material quarried at both was well represented in archeological sites submerged by the Angostura Reservoir on the Cheyenne River. Other stone, including agate, chalcedony, and chert, suitable for making projectile points, is also found in the general area (Wedel 1961:272; Sundstrom, L. 1990:59-60; Wedel and Frison 2001:44-45,49). Evidence for the prehistoric quarrying of chalcedony is found at a number of documented sites in Wind Cave National Park or on its borders (CU0869, CU0870, CU0871, CU0872, CU0873, CU0875, CU0876, CU1194, CU1235, CU1236, CU1285*)*.

In the Lakota language, the flint and quartzite used in knapping is called *wahin* or *wanhi* (Buechel 1970:517,541). The Cheyennes had at least two names for flint: *mopatonoz* was the flint used to start fires, and *moxoz* designated the quartz from which arrowpoints were fashioned. Flint was the preferred material for arrowheads before Europeans introduced trade metals (Buechel 1970:517,541; Grinnell 1972:1:184). The Cheyennes once armed their elk horn scrapers with a piece of flint (Grinnell 1972: 1:213), and they made other scrapers from this mineral too (Grinnell 1972:1:214). As mentioned elsewhere, the Lakotas attributed prehistoric arrow points to the work of spiders (Smith, D. 1949:307; DeMallie 1984:311n6; Brown 1992:47), and the Cheyennes believed they were "shot" by the Thunders (Whiteman in Schwartz 1988:54). Flint was probably the stone that *Itokaga* gave *Wohpe* because it was described as a stone that could be rubbed to make fire (Sword in Walker 1983: 68). Peter Bordeaux (1929:155) reports that "a pair of flint rocks were held against a small pile of decayed powdered wood and struck together with a glance, chipping off sparks which would, when coming in contact with the decayed wood, start a flame."

Quartzite probably had religious functions in earlier times too because one member of the Black Hills Expedition, Samuel Burrows (in Krause and Olson 1974:208) reported that atop Inyan Kara Mountain "small pieces of white quartz were found. As they had no geological business to be there, they were no doubt left there by the Indians, who are fond of making offerings to their gods from these lofty altars." There is little recorded about the use of quartz for religious purposes among the Lakotas or the Cheyennes in more recent periods, although the missionary John Williamson (1970:162) records the Dakota name *Inyan ocaze* for this mineral. For crystal, he uses the words, *kohdi* or *zanzan* (Williamson 1970:42). *Kohdi* or *Kogli* in Lakota is also the word for flint corn, a name that describes its transparent quality (Riggs 1968:294; Buechel 1970:314, 825). *Zanzan* is the Dakota word for glass (Riggs 1968:651) or *janjan* as it is written in Buechel's Lakota dictionary (1970:267). In a story told by Wawoslata in 1915, *Inyan janjan* was mentioned as one of the stones used in a *Yuwipi* ceremony that took place at the Race Track in prereservation times (in Stars, Iron Shell, and Buechel 1978:264-265 [also in Buechel and Manhart 1998:452-453]). George Bushotter (in Dorsey 1889:153-154), a Lakota scholar, wrote there were two sorts of "mysterious stones," one that was white and looked like ice or glass and another resembling "ordinary stones." Rufus Pilcher (1964) reported that crystalline stones from Wind Cave were desired by the Lakotas for healing. Knowing the importance of such stones in the practice of *Yuwipi*, including the round crystalline ones ants bring to the surface of the earth, it is very likely that any of a variety of translucent quartzite stones hold importance today as well. It should also be mentioned that quartzite stones from the Black Hills were kept in the Plains Apaches' most sacred religious bundles (McAllister 1965).

GYPSUM[*Selenite*]

Gypsum [*Selenite*] is found throughout the Black Hills, and it is especially characteristic of the formations straddling the Red Valley including those found at Wind Cave National Park. It is an important mineral for the Cheyennes and Lakotas, who commonly refer to it as "mica." William Ludlow, Chief Engineer of the Custer Expedition, reported a site on the northwestern side of the Black Hills where there were enormous quantities of gypsum that were quarried by local tribes who left offerings there (McLaird and Turchen 1974:293). According to John Moore (1974a:197, 1981:14), the Northern Cheyennes continue to quarry their gypsum in the Black Hills and in a shale formation at Bear Butte. Cheyennes in Oklahoma, however, apparently now secure their supplies from beds in the Southern Plains (Moore 1996a: 67).

The Cheyennes had many practical and spiritual uses for gypsum, which was called *haoseton* [also means "hail"] (Moore 1974a: 174) or *Ova-e* (Whiteman in Schwartz 1988: 54). Burnt gypsum was used to whiten the backs of their bows (Grinnell 1972:1:175) and as a glue to attach tiny red feathers to the tips of eagle feathers (Grinnell 1972: 1:222). Women rubbed white gypsum on their hands to prevent robes from being soiled when they were decorating them with quills (Grinnell 1972:1:164). Powdered gypsum marked the ground where the altar was built at the *Massaum* [Animal Dance] and the *Oxheheom* [Sun Dance] (Grinnell 1972: 2:292, Schlesier 1987:93). It was also mixed with fat and painted on the small altar sticks that represent the Cheyenne people during the Sun Dance (Whiteman in Schwartz 1988:54). In their Sacred Arrow ceremony, it is ground into a fine powder and melted into a mold to represent the moon. This object is attached to a sacrificial bush outside the arrow tepee, which the Cheyennes call *vozem* or frost (Whiteman in Schwartz 1988:4). The Cheyennes believe the gypsum found in the Red Valley is the remains of froth spilled from Slow Walking Buffalo's mouth when she raced around the Hills in the Great Race (Marquis and Limbaugh 1973:30-31). Also, the Cheyennes' hero, Stone Boy, was conceived after his mother swallowed a fragment of gypsum or what Grinnell (1926:179) translated as a "Sun Arrow."

The Lakotas also appear to have associated gypsum with frost and ice. No name has been uncovered for it in linguistic sources. However, in James Walker's creation cycle (1983:220-221, 222-223, 227-228), *icage*, "white fruits," were said to grow under the earth, suggesting the crystalline formations in caves. *Taku Skanskan* made entrails from these fruits and molded a masculine father and feminine mother figure from them, the first *Pte Oyate*, and gave them the fruits as their source of eternal nourishment (Walker 1983:225-226, 249). Like the Cheyennes, the Lakotas sprinkled powdered gypsum on the ground around the *Winwanyan wacipi* [Sun Dance] altar (Densmore 1918:122).

Icage means "to make something with" (Riggs 1968:171; Buechel 1970:199). The related word, *icago*, refers to a mark or line that is drawn or sketched on something (Buechel 1970:199); gypsum powder is certainly used in this way. Also related is the word *icaga*, which means to grow, and it is associated with the maturation of plants, animals, and other living things (Buechel 1970:199), while *kaga* means to transform something through making or imitation (Buechel 1970:271). Another term, *wak-icaga*, refers to a sacred ceremony, and the generative effects it creates (Buechel 1970: 835). *Icage* and *icaga* might be connected to the word *caga* [ice, to freeze] as well (Riggs 1968:84; Buechel 1970:113). In so far as ice is the outcome of a transformative process that occurs when cold air interacts with water, it has the capacity to expand or grow. Gypsum expands and contracts in response to temperature change. It also has a glass or ice-like appearance.

SLATE

Slate also exists in the Black Hills and its surrounding areas. In Lakota, slate is called *inyan sapa* [black stone] (Buechel 1970: 228). Historically black slate was used by the Cheyennes in making axe heads and scrapers (Grinnell 1972:1:186, 214). The same was probably the case for the Lakotas. No ceremonial uses for this stone have been identified in the ethnographic literature, although Wawoslata mentions *inyan sapa* in the story about a *Yuwipi* being performed at the Race Track (in Stars, Iron Shell, and Buechel 1978:264-265; [also in Buechel and Manhart 1998:452-453]).

LIMESTONE

No names have been uncovered for limestone in either the Lakota or Cheyenne language. In Dakota, the limestone cliffs along the Mississippi River near St. Paul are called *imniza ska dan* [little white rocks]. Since white clay is called *maka san*, light colored limestone might also be called *inyan san.* This is the rock from which Wind Cave and other caves were formed in the Black Hills. The Lakotas used ground white limestone in making their paints (Bordeaux 1929:182), and they powdered and applied it to skins when these were being tanned (Bordeaux 1929:183). It is also one of the rocks used in sweatlodges.

SANDSTONE

Sandstones make up the Hogback formations that surround the Black Hills on the outer edge of the Red Valley. The Lakotas and Cheyennes used various grades of sandstones to make mauls, hammers, axe heads, grinding stones, and knives (Grinnell 1972: 1:211). Finely grained sandstones used in the making of knives were called, *miogle* or *miyogli* in Lakota (Buechel 1970:336). The Lakotas and Cheyennes relied on these sandstones for finishing off arrowshafts (Grinnell 1972:1:179). According to Francis Densmore (1918:438), these stones were found in the Black Hills. The Lakotas called the rougher varieties that were employed in the manufacture of axeheads and hammers *izu'za* or *inyan iguga* (Buechel 1970:266, 744) or *wiyakainyan* [thunder stone] in Dakota (Williamson 1970:190). There were also ceremonial uses for sandstones. Thomas Odell (1942:23-24) describes a formation near Bear Butte as follows:

> Many small concretions of brownish color, divisible into two parts, each of which forms a cup-like receptacle, abound in the vicinity of Bear Butte. The Dakotas, it is said, gathered and polished these stones, on which they engraved pictures of Bear butte, together with those of the sun and moon. It is reported that some of these stone idols are still in existence.

GRANITE

The central core of the Black Hills is made of granite, but no specific information on the meaning and use of granite was found in the ethnographic literature on the Lakotas or the Cheyennes. The Dakota, however, named this stone *inyanhcake* (Williamson 1970:77). This might be related to the word *hcaka*, which means "real" or "true" (Buechel 1970:192). If so, it might well imply the idea of an original stone.

HEMATITE

Another mineral located in the Hills is hematite. According to John Moore(1981: 14), the Cheyennes collected red hematite from locations in the Hills to use as a pigment in their ceremonial paints.

COAL

The Cheyennes also quarried coal in the Black Hills to use in the production of their black ceremonial paints (Moore 1981:14). Coal is called *cahli* in Lakota (Buechel 1970:114) and *ho?kóse* in Cheyenne (Northern Cheyenne Culture and Research Center 1976:22).

CLAYS AND SOILS

Soils and clays are identified with a spiritualized feminine generative principle in Cheyenne and Lakota cosmologies. The Cheyenne call the earth *Escehewan* [The Earth or Our Mother] (Powell 1969:2:437; Schlesier 1987:5,8,82; Moore 1996a:208, 211). and the Lakotas call her *Maka* or *Maka Uçi* [Grandmother Earth] (Buechel 1970:328; Sword in Walker 1980:102; St. Pierre and Long Soldier 1995:74, 97, 110; Bucko 1999:208). Pulverized earth is present at all major Lakota and Cheyenne ceremonies (Densmore 1918:218, 222; Kemnitzer 1970:54; Schlesier 1987:6). Earthen clays and shales were important too, and they were used in making paints for ceremonial and practical purposes. These materials were ground into powders and then mixed with water or animal fats (Walker 1982:100). Many different locations have been reported for these clays, including sites in the Black Hills.

WHITE CLAY/EARTH

White clay, *maka san* in Lakota (Buechel 1970:329), was used to paint horses because it purportedly produced a "genuine color" (Densmore 1918:353). The Cheyennes used white clay to draw the patterns for quilling a robe, they applied it to the skins and heads of birds worn as talismans in war, they rubbed it on men's bodies when war shields were painted and on women when they tanned a white buffalo robe. They used it to whiten the feather plumes and buffalo robes worn in the Sun Dance, and they applied it to the pins that surrounded the Sun Dance altar (Grinnell 1972:1:163, 192, 2:202, 242, 262). According to Francis Densmore (1918: 116), the white earth used by the Lakotas for paints came from local sources, but she does not specify the locations where it was gathered. The Lakotas also relied on streaked clay to make toy horses for children that were called *maka'tanasula*. Again the site where it was collected is not identified (Buechel 1970:330). Chalk is *vótanotse* and white clay *vóetséna?e* in the Cheyenne language (Northern Cheyenne Language and Culture Center 1976: 89).

BLUE CLAY/EARTH

Blue earth, *maka'to* in Lakota (Buechel 1970:330), is found in southern Minnesota and also at a location between the Black Hills and the Powder River (Densmore 1918:116). Helen Blish (1934:186) wrote that the blue paint applied to the joints of the Sacred Bow Society dancers came from a site near Lusk, Wyoming. John Moore (1974a:259; 1981:14) claims that the Cheyennes procured their blue clay in the Black Hills, but he does not identify any location other than Bear Butte. This clay was combined with charcoal and used as a black paint in the *Massaum* (Grinnell 1972:2:301-308-309). Among Lakotas, it was used as a paint in the Sun Dance (Sword in Deloria 1929: 402). Tthe color blue stands for the cloudless sky, and it signifies success (Densmore 1918:77,124). It also represents the quarter moon (Densmore 1918:77). Among Cheyennes, it signifies the sky and serenity (Petter 1915:97; Grinnell 1972:1: 168).

RED CLAY/EARTH

Lakotas used red earth, *maka'wase* and vermillian, *tani span* or *wase aceptipi* for painting (Buechel 1970:330,480,549). Quite likely, some of the clay found in the Red Valley or the Race Track was once used for this purpose. The red colors of the soils in the valley are believed to be the remains of the blood spilled by the animals as they careened around the valley in the Great Race (LaPointe 1976:19; Walking Bull 1980:8; Whiteman in Schwartz 1988:51). Red earth is called *neoma* in Cheyenne (Whiteman in Schwartz 1988:51). Some Lakotas also used a yellow earth, *maka zi*, which was found near Standing Rock, to produce red paints. Francis Densmore (1918:116) described how it was made in some detail. As she wrote:

> A yellow ocherous substance which after being reduced to a fine powder is used by the Indians in making a yellow paint. This substance when treated by means of heat yields the vermillion used on all ceremonial articles as well as in painting the bodies of the Indian. The baking of this ocherous substance -- a process which requires skill is done by women. First, the substance mixed with water is formed into a ball. A hole is dug in the ground in which a fire of oak bark is made. When the ground is baked, the coals are removed, the ball is placed in the hole, and a fire is built of the substance usually prepared at the time. The action of the heat changes the color of the substance to red. When the ball is cold, it is pounded to powder. In the old days this red powder was mixed with buffalo fat in making the paint, but at the present time it is mixed with water.

The Cheyennes relied mostly on red hematite for their paint, which they also secured somewhere in the Black Hills (Moore 1981: 14). They also called red clay or earth *má?o-ma?otse*, and they believed that it was the substance out of which humans were made (Northern Cheyenne Language and Culture Center 1976:35). Among the Cheyennes and Lakotas red paint signified blood. The Lakotas' Sun Dance altar was surrounded by lines traced in the earth; these were filled with tobacco, then covered with red paint powder and topped with gypsum dust (Densmore 1918:122). This is curiously suggestive of the Race Track with its red soil, the vestige of the blood spilled by the animals in their primal race, and with its ribbon-like striations of gypsum that cut through the sedimentary formations bordering the valley. Red also signifies a full moon or the clouds at sunset, which forecast good weather, while yellow represents the morning sky at sunrise or forked lightning (Densmore 1918:77, 124-125). Red has similar meanings for the Cheyennes who link it to life, blood, food, and warmth; yellow signifies the sun, beauty and ripeness (Petter 1915:97; Grinnell 1972:1:168; Powell 1969: 2:33, 417, 422, 425). In both tribes, red paint was rubbed on dancers and applied to sacred paraphernalia in most major ceremonies (Densmore 1918:124-125, 127, 139, 167, 205, 208, 330; Grinnell 1972:2:122-123, 300-304, 328-329, 345-346; Walker 1980: 183 -191, 234-235).

Much more detailed information on the symbolic meanings and applications of various colors for decorative or ceremonial purposes can be found in most of the standard ethnographic sources on the Lakotas and Cheyennes (Densmore 1918; Wissler 1910; Lyford 1940; Hassrick 1964; Walker 1980, 1983) and the Chey-ennes (Powell 1969; Grinnell 1972; Moore 1996a).